KC Weed News – October 2006

(http://dnr.metrokc.gov/Weeds/kcweednews.htm)

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Weed of the Month: Bittersweet Nightshade (*Solanum dulcamara*)

(http://dnr.metrokc.gov/wlr/lands/weeds/nightshade.pdf)

Several years back I was surprised to learn that the weedy Eurasian vine known as bittersweet nightshade was the most commonly found plant in a survey of King County's wetlands, more common than any native plant and more common than any other weed. From my own informal surveys, it appears that this plant is one of the most common plants in our backyards and vacant lots as well. If you are out pulling weeds this time of year, you will likely notice the bright red, almost translucent berries dangling in loose clusters from vines scrambling up and over trees, fences and old buildings. In the summer, it would also have been easy to spot the distinctive flowers with their purple, star-shaped, backward-pointing petals and yellow central cone of fused anthers. Even without flowers or berries, I find it fairly easy to identify this plant from the somewhat purplish color of the leaves and the ear-like lobes at the base of most of the leaves. If you allow it to grow freely, bittersweet nightshade can climb 30 feet up trees or form dense thickets along the ground. The base and lower stems are woody and persist for several years, but the upper stems usually die back in the winter.

Bittersweet nightshade is not the same plant as deadly nightshade or belladonna (an uncommon and extremely poisonous plant). However, it is also poisonous and can cause serious injury or even death in some cases. The entire plant contains solanine, the same toxin found in green potatoes and other members of the nightshade family, and it also contains a glycoside called dulcamarine, similar in structure and effects to atropine, one of the toxins found in deadly nightshade. The toxin amount varies with soil, light, climate and growth stage and so the plants may not always contain enough toxins to be dangerous – but don't let one lucky experience mislead you. Ripe fruits are less toxic than the leaves and unripe berries but even ripe berries can be poisonous. This plant has caused loss of livestock and pet poisoning and has caused death in children who accidentally picked the berries, probably because it was growing with blackberries. Symptoms of poisoning include: abdominal pain, headache, flushing and irritation of the skin and mucous membranes, and tiredness. Severe cases can result in

vomiting, thirst, difficult breathing, restlessness, subnormal temperature, paralysis, dilated pupils, diarrhea, blood in urine, shock, extreme weakness, loss of sensation, and occasionally death. Fortunately for us all, bittersweet nightshade also has a strong, unpleasant odor so most animals will avoid it and poisonings from this plant are not very frequent.

Although bittersweet nightshade is not usually the dominant weed where it is found, in some local creeks and wetlands it has formed large, dense and damaging infestations. On Cottage Lake Creek, for example, bittersweet nightshade is so prolific that it is growing out into the creek, creating a false gravel bed and interfering with fish movement upstream. The only break in nightshade cover along the streambank is the occasional large evergreen tree and even the alders are draped with nightshade vines extending up as much as 30 feet. In another small creek near the Sammamish River, King County crews have had to repeatedly remove over a hundred bags of nightshade each year for the past three years with very little reduction in growth. It is not clear what conditions make it possible for nightshade to become so dominant in some cases but not in others. Seedlings and mature plants can survive in shade but thrive and bear fruit with more sun. Nightshade tolerates a wide range of soil moisture but does best in moist or wet soil and it does seem very capable of taking advantage of disturbed, moist habitats and out-competing native shrubs and even small trees such as willows and alders.

Perhaps because of its wide distribution, bittersweet nightshade is not classified as a noxious weed in Washington. In fact it was removed from the state list in 1999. In King County, it is classified as a Weed of Concern (also known as “invasive vegetation”), and control is recommended when restoring natural areas. For more information on bittersweet nightshade, see our fact sheet: http://dnr.metrokc.gov/wlr/lands/weeds/nightshade.pdf or contact our office by email at noxious.weeds@metrokc.gov or by phone at 206-296-0290. Because this plant is very widespread and not on the State Noxious Weed List, we are not tracking locations. However, if you know of any heavily infested natural areas or streams, we would be interested in having that information. We are also gathering information on effective control methods. If you have had any success (or failures) controlling this plant, please contact Sasha Shaw at 206-263-6468 or sasha.shaw@metrokc.gov.

Oct. 7 and 8 – Issaquah Salmon Days Festival

Please join us this weekend at the Issaquah Salmon Days festival. Our noxious weed booth will join an expanded educational area in the Fish Hatchery parking lot along with other great booths with information on improving the environment for water quality and wildlife. Bring the kids for great activities and don’t miss the salmon barbecue! Check out the festival website at http://www.salmondays.org/home/.

Oct. 21 – Weed Workshop at Northgate Community Center

On Saturday, October 21, from 1:30pm - 3:00pm, we will be holding a free class on “Backyard Invasions: Noxious Weeds in Seattle's Greenspaces” at Seattle’s beautiful new Northgate Community Center. Invasive plants pose a serious threat to the health of urban streams, forests and natural landscapes. Noxious weed education specialist Sasha Shaw will present a slide show on invasive plants that are threatening community parks, waterways and natural areas. Learn how invasive and noxious weeds spread, where they come from, and how to keep from them from spreading any further. Invasive weeds can seriously degrade a community's natural resources, but if everyone works together, even the toughest neighborhood weed bullies can be stopped! **Register at the Northgate Community Center in person or by phone at 206-386-4283**. The address is 10510 5th Ave NE, Seattle, WA 98125.

Nov. 1 to 3 – WA State Weed Association Conference

The 56th Annual Weed Conference will be held on November 1 to 3 in Yakima. This is Washington's main weed conference for crops, ornamentals and vegetation management. The conference website is http://www.weedconference.org/info/. This is a good conference for people in the field of weed control or vegetation management. Some of the talks scheduled for this year that look the most relevant to our county's weed issues include:

- Climate Change: Implications for Weed Management in the Pacific Northwest
- Frogs, Salmon, & Herbicides: Separating Hazard from Risk
- Weed Control in Vegetables with Organic Herbicides and Flame
- Have You Had an Update on Glyphosate Resistant Weeds Lately?
- The Washington State Program for Control of Invasive Knotweeds
- Biocontrol Results in Western Washington
- Natural Vegetation Management Research Results
- Yellow Flag Iris Control, in the Mission Valley of Western Montana
- Noxious Weeds - New Invaders

Nov. 8 to 9 - Integrated Vegetation Management In Practice (PNW-IVMA Conference In Portland, Oregon)

Another great conference for weed workers to attend this fall is the PNW-Integrated Vegetation Association's annual conference, http://www.westernforestry.org/intvegmgmt/intvegmgmt.htm. This one is more focused on right-of-way and forestry weed control but also covers topics relevant to managing invasives in natural areas and general weed control issues. Some topics that look particularly relevant to noxious weeds and invasives in King County include:

- Integrated Vegetation Management in Practice: Concepts, Principles and Techniques
- Practical Applications for GIS in Tracking Operations and Inventorying Vegetation
- Herbicide Toxicology: What We Know and What We Don't Know
- EPA County Bulletins on Herbicide Regulation in Relation to the ESA
- Setting Thresholds for Weed Control Actions
- Effective Control Methods for Commonly Encountered Shrubby and Herbaceous Weeds
- Effective Control for Undesirable Trees
- Six Years of Riparian Weed Control Along the Sandy River in Oregon
- Weeds to Watch For: Weed Species on the Verge of Exploding in Our Region
- Blackberry Rust Fungus

Weed-Eating Goats in Seattle? Oh My!

One of most common questions we get these days is about using goats for weed control. This method has been around forever but it is getting a lot of attention these days as people look around for cost-effective weed management that has low impacts on the environment. For farmers and others with their own goats, it isn't any surprise that they will eat almost anything. But for people in urban areas and vegetation management professionals, it may be news that they can hire goats to do some of the hard work of clearing invasive plants. A recent story in the Seattle P-I described just this method as used by Seattle City Light: http://seattlepi.nwsource.com/local/286630_goats27.html.

Highlights from the UW Botanic Gardens' Invasive Plant Conference

There was a full house and a packed agenda at the recent two-day conference on invasive plants held by the UW Botanic Gardens at the Center for Urban Horticulture. There were lots of interesting presentations but the main thing I noticed from this conference was a building

momentum from the national to the local level in efforts to address invasive plants. There is a sense of urgency among agencies, conservation groups and natural resource managers in the northwest, a sense that we can still make a difference but that so much more work is needed and it needs to happen quickly. The optimistic message that I heard again and again is that with better communication and coordination between us all, we can do a much better job and maybe even effectively achieve our goal to reduce the impact of invasive species on the natural resources of our region.

For those of you who were unable to attend the conference but who are interested in delving deeper into the issues and the science, I've written up notes for most of the talks I attended. Unfortunately, I was only able to attend one talk at a time, so there were many that I missed during the concurrent sessions. We were also given short summaries of all of the talks, so if you would like even more information, please let me know and I can send you a copy.

Invasive Plants in the Pacific Northwest: Where to From Here, *John Randall, The Nature Conservancy*

This kick-off talk was great for giving us all inspiration and focus for the rest of the conference. Some good take-home ideas were, first, to promote what we want and second, to focus on the weeds that are doing the most damage to those things we care the most about. John had a great idea to map where invasive weeds currently are absent in a natural area and then work out from the strengths of this core area and try to remove inroads and corridors into the high quality area. He also had the very practical suggestion to try out the free mapping software they developed: WIMS (Weed Information Management System) at http://tncweeds.ucdavis.edu/wims.html. Another important reminder was that there are sometimes very long lag times before we realize that an introduced plant has the potential to cause serious damage; in some cases it can be up to 90 years before we start to really see impact and by then it is often too late. Early detection is the effort to notice this potential while there is still a possibility of rapid response and eradication. Of course, that will take a lot more eyes trained to look for early invaders and more resources to give to the responders to deal with these invasives quickly.

Early Detection Protocol Development in the National Parks, *Susan O'Neil, National Park Service, Inventory and Mapping Program, Pacific West Regional Office, Seattle WA*

This talk presented a new Early Detection Handbook developed by the National Park Service along with USGS that will be available in April 2007. One of the key strategies is to look outside the borders, share data with neighbors – other counties, states, countries – and see what they are struggling with, what weeds might be coming our way next.

Developing Early Detection Networks to Abate the Invasive Species Threat, *Kyle Strauss, The Nature Conservancy, Portland OR*

In Oregon, TNC is setting up an early detection and rapid response (EDRR) network for their project sites in the state. Kyle presented this program and also described other programs. This talk was very motivational for me to work toward a similar network in the Puget Sound region. We have many experts and avid naturalists in the region who could all be a part of a system of early detection and we have agencies and non-profits that could respond efficiently to new threats if they were detected early enough. It will just take some organization and we could have a system similar to programs found elsewhere in the country. I also liked the credit card analogy Kyle used – we owe it to the future generations to eliminate our debt of invasive species before it spirals out of control. One of the key challenges is that it is hard to find funding for weed control before a plant has proven to be a huge problem and by then it is too far gone.

The First Line of Defense: Interceptions of Federal Noxious Weed Seeds in Washington
Margaret Smither-Kopperl, USDA-APHIS-PPQ, SeaTac WA

Margaret opened our eyes to the many ways that seeds travel into our busy ports. It is amazing to me that Margaret and other inspectors are able to spot seeds and other plant parts as so many people and packages and containers enter our port. It was interesting that giant hogweed seeds are used as a spice in some countries and occasionally show up in personal luggage. Also, many pottery shipments and quarry tiles are contaminated with a surprisingly high variety of seeds because they are left outside in the source country where the wind can blow all sorts of things into the pots and tiles. It is good to know that some seeds are stopped but of course this is limited by the number of inspections they can do and by the short list of target species. There is no way that all seed introductions could be prevented this way so it is clearly of the utmost importance that APHIS inspectors are focusing on the most important species. Unfortunately APHIS can only stop federally listed noxious weeds but Margaret did mention that states will be informed if a state-listed noxious weed is detected and being brought into the state. I didn't hear how this notification was done or if it always happened – might be a good thing to find out more about.

A NEPA Strategy for Early Detection/Rapid Response, *Rochelle Desser, TEAMS Enterprise, USDA-Forest Service*

Rochelle explained the challenge facing the Forest Service in their somewhat conflicting goals to minimize the environmental impacts of their activities through NEPA and to respond quickly and effectively to new invasive plant threats. They have developed an approach that attempts to satisfy both goals by focusing on the premise that similar treatments at similar sites have similar effects. They are trying to find the intersection between acceptable costs, effective methods and minimum risk. Implementing this approach will be a huge challenge but it is definitely moving in the right direction if invasive plants are to be addressed quickly on forest lands.

Building Consensus: Working Together to Manage Invasive Plants in Southwestern British Columbia, *Dawn Hanna, Greater Vancouver Invasive Plant Council, Vancouver, BC*

It was very encouraging to hear about the start up of this Invasive Plant Council just north of the border. We share many invasive species with the area around Vancouver BC and we can certainly learn from each other and share information. It was interesting to see their list of "Usual Suspects": English ivy, Himalayan blackberry, English holly, yellow flag iris, Scotch broom, giant hogweed, purple loosestrife, creeping buttercup, reed canary grass and one of my current least favorites, yellow archangel. We might add a few more, but clearly these are all as much of a problem here as up north.

Persistence of *Polygonum cuspidatum*: Lessons Learned From Six Years of Field Trials, *Jason Dumont, The Nature Conservancy, Portland OR*

Jason reported on the lessons learned from six years of knotweed control along the Sandy River in Oregon. Although the impact is greatly reduced, they are finding that plants persist and re-appear much more than you would expect from the reduction in above-ground growth. Unfortunately, what happens is that knotweed produces only small shoots and leaves after several years of treatment and no longer translocates enough herbicide into the remaining rhizome. However, after treatment stops, the knotweed re-emerges from the rhizome and can eventually build back up to full size plants if left alone. Their current strategy is to treat new sites the same way they have been but try a new approach for treated sites with small shoots. They plan to either wait a year or two before treating again so there will be enough re-growth for sufficient herbicide uptake or, for small sites, dig up the remaining rhizomes in spring as the new shoots emerge. Their current treatment plan for the first year is to either spray in early to late

summer with 1% imazapyr plus 4% glyphosate or for smaller stands to inject 3 to 5 ml of glyphosate. If needed, they will retreat in late summer. All treatment sites are monitored for at least 3 years after knotweed is last seen.

Phalaris arundinacea Control and Riparian Restoration within Agricultural Watercourses in King County, Washington, *Lizbeth Seebacher, UW Botanic Gardens, UW*

This study was inspired by the need of King County farmers to maintain their agricultural drainage ditches in the face of daunting infestations of reed canary grass. To summarize, it seems that Lizbeth found that she was able to suppress the reed canary grass fairly well by applying a heavy, dense mulch of red cedar hogfuel in combination with a thick barrier such as burlap or with competitive plantings of willows and other species. She also found out that small fruited-bulrush showed promise as a competitor to reed canary grass when it was allowed to get fully established.

Use of Risk Assessment Information to Determine Treatment Buffer Widths, *Diana Perez, USDA Forest Service*

In developing their treatment strategies to control weeds effectively but still minimize environmental risks, the Forest Service needs to have a process for deciding on appropriate buffers for different herbicides, for different site conditions and for different methods. This presentation showed that "one size fits all" does not work and that it is possible to group herbicides and treatment methods by using risk assessments and develop a matrix of these groups and the surface water body types (wetlands, lakes, streams, ditches, etc). Larger buffers should be used for higher risk methods than for lower risk methods (broadcast spray vs. spot spray). Similarly, herbicides with higher risks to aquatic organisms would have larger buffers. At the risk of missing some details, here are some of the buffers Diana reported for streams in Region 6:

Imazapic, 100 ft buffer for broadcast; 15 ft for spot spray
Chlorsulfuron, 100 ft for broadcast; 50 ft for spot spray
Triclopyr-BEE (ester), No broadcast allowed; 150 ft buffer for spot spray
Glyphosate (aquatic), 50 ft for broadcast; to edge of water for spot spray

A Summary of Herbicide Effects to Wildlife, *Shawna Bautista, USDA Forest Service*

This talk reported on the analysis of herbicide effects on wildlife done for the Region 6 EIS on invasive plants. Shawn stressed that this analysis was highly conservative and looked at the "no effect" dose for the most sensitive species and used worst-case scenarios for acute impacts. In other words, they looked at the amount of an herbicide that would do any amount of damage to a very sensitive animal if it got the maximum exposure of that dose. Given all that, the herbicides with the highest potential for adverse effects to wildlife in order from highest to lowest were: 2,4-D, dicamba, triclopyr and glyphosate. Of these, 2,4-D had enough of a risk to wildlife, especially for herbivorous animals and birds, that the Forest Service won't be using it in Region 6. Dicamba had higher risks for reproduction for some wildlife and triclopyr generally had a low risk but had a higher risk to birds and at high application rates could have impacts on reproduction as well. Glyphosate surprisingly also had higher than expected risks, but only at high application rates. None of the herbicides they looked at had risks for mammal-eating and fish-eating birds. Some newer herbicides such as the sulfonyureas appear to pose very low risks to wildlife but this is based on current data and so newer products might not have as much data to analyze.

Developing Bid Specifications for Invasive Plant Management Programs, *Steven Manning, Invasive Plant Control, Inc.*

For anyone setting up a contract for weed control projects, especially in a natural area, this talk was very useful. Steven's company has a handy free booklet on the subject and they will even email you example RFP's for your own use. Here are a few things from their long list of recommendations and tips.

- Find out the skills and education of the crew members who will actually be on site doing the work
- Specify the target weed species (test the contractor and crew in the field to make sure they can identify the weeds)
- Specify what desirable species need to be protected on the site (again, test the contractor and crew in the field to make sure they can distinguish desirable plants from target weeds)
- Agree on disposal plan for dirt and plant materials
- Check equipment for leaks
- Specify weed control method by site type and clearly detail methods
- Require performance guarantee (such as 95% mortality or hold back 10% of payment until the following season)

Invasive Species in Natural Resource Management: The Federal Perspective, *Ann Bartuska, USDA Forest Service*

This talk began with a reminder of the ecological, economic and social threats posed by invasive plants. For example, invasive plants cover 133 million acres in the US, cause 50 to 85% loss of biodiversity and cost the US economy $138 billion. The Forest Service strategy on invasive plants is to work across jurisdictional boundaries and to focus on prevention. Programs include pathway analyses, threat assessments of weed species, sharing with international partners, communications and outreach. The Western Wildland Environmental Threat Assessment Centers (WWETAC) are playing a key role. They will base management priorities on wildland values assessment and spread predictions for invasive weeds. The completion of the programmatic EIS for invasive species is a big step as is the completion of the native plant policy. The Forest Health Protection program will continue to help fund invasive plant projects and research on invasive species is another priority of the Forest Service. They would like to encourage more "citizen scientists" to help detect new infestations.

The Spread of Invasive Exotic Plants in Alaska, *Michael Shephard, USDA Forest Service*

It is eye-opening to find out that invasive weeds are becoming increasingly problematic even as far north as Alaska. Alaska is still in the early stages of invasion for most noxious weeds and has a very real chance to stop their spread if they can mobilize an effective response plan. About one third of the non-native species they found in recent surveys have only been collected in the past 20 years. However, it is very challenging to get the attention of the public and policy makers before the impacts are widespread and obvious. They have developed a state-wide invasive plant database that can guide response efforts and outreach programs but first they have to convince people to act now while there is an opportunity. Some of the noxious weeds in Alaska that are familiar to us in King County are yellow hawkweed, Canada thistle, spotted knapweed, reed canary grass, policeman's helmet, tansy ragwort and garlic mustard.

Control of Potentilla recta (sulfur cinquefoil) in an Undisturbed South Puget Sound Prairie, *Cliff Chapman, The Nature Conservancy of Washington*

Sulfur cinquefoil is a direct threat to native prairie species. Unfortunately, this spring the Nature Conservancy discovered a large infestation of this weed in the highest quality prairie left in the Puget Sound region. Acting quickly, they developed a plan and treated the infestation in

the short window of opportunity they had before the site was off-limits due to Fort Lewis activities. They soon found that a 3% foliar spray of 2,4-D ester did not control the species but that they had good results from a 2.5% foliar spray solution of triclopyr amine (Garlon 3A) plus 0.25% of the surfactant Nufilm IR (a quick-drying product that allowed spraying in the short rain-free periods we had this past May). They had good results treating in the rosette and the bud stages. After treatment, they measured 97% control and dug up roots to confirm that the plants were truly dead. Cliff also confirmed that the similar-looking native prairie cinquefoil *Potentilla gracilis* is also present in the same prairie but that they found no evidence of any hybridization between these species. There is also sulfur cinquefoil present in the area around Fort Lewis so there may be a risk of re-invasion into the prairie from these populations.

Biology and Management of Invasive Hawkweeds (Hieracium spp.) in the Pacific Northwest, *Linda Wilson, University of Idaho*

There are about 14 different species of invasive non-native hawkweeds, all but one with yellow flowers (orange hawkweed being the obvious exception). Non-native hawkweeds were first noticed in the west between 1945 and 1960 and now they cover at least 2.5 million acres and are spreading at a rate of 16% per year. The take-home message is that if you have a relatively small infestation of hawkweed, it is crucial to take quick action because once it is established, it may too late to do anything but contain the population. Hawkweeds reproduce asexually most of the time so they can spread rapidly but they can also cross-breed to keep their gene pool diverse. They are especially good at spreading in low-nutrition soils and at higher elevations. For control, it usually helps to add fertilizer to the treatment and both Transline and Milestone are effective herbicides on hawkweed.

Biochemical Effects of *Centaurea maculosa* (spotted knapweed) on Soil Nutrient Cycles and Plant Communities, *Andrea Thorpe, Institute for Applied Ecology*

Spotted knapweed has got it made when it comes to having an advantage over native grassland species in the western United States. You might have heard that it is allelopathic and this talk reported on several of the mechanisms it uses to out-compete other plants chemically. The chemical catechin is produced from spotted knapweed roots. In its native lands other species are able to tolerate this but in Montana the native plants are hurt by this chemical. Spotted knapweed also reduces the amount of nitrate available in the soil to other plants and this further inhibits its competitors. Again, this is not the case in its native range. In addition, the chemicals produced by spotted knapweed reduce phosphate uptake by other plants and make it more available for its own uptake. This study really brings home the message that an introduced plant can have a huge advantage and even modify the habitat to make it less hospitable to the existing species.

Managing Rangeland Invasive Plants with Aminopyralid (Milestone Herbicide), *Vanelle Carrithers, Dow Agroscience*

A research biologist for Dow Agroscience reported on their new herbicide aminopyralid (sold under the name Milestone). This product was registered by EPA under its Reduced Risk Pesticide program. It is not a restricted use herbicide and can be used in many different types of sites including right up to the water's edge. It generally won't damage most grasses (but check the label to make sure) and is effective on a wide range of broadleaf weeds. It is most suited for rangeland, roadsides, pastures, wildlands, and other non-crop sites. It is not a good choice for yards or fields that are being cut for hay or composted grass clippings. The chemical remains active until it is broken down by soil organisms, so grass cut from a treated field would have active herbicide in it. In other words, you can't use treated grass for compost for about a year after treatment. There isn't a risk to wildlife or livestock, but there is a risk to garden plants and other broadleaf plants that might come into contact with composted grass cuttings. A nice

feature of aminopyralid is how little active ingredient is needed (3-7 fl oz per acre) so you will use less product overall. Unfortunately, this also means a bottle of Milestone is quite expensive although it will go a long way. Vanelle also reported on trial results of this product. They have found that it is effective on a wide range of invasive and noxious weeds – thistles, knapweed, hawkweed, etc. – but not on all of them – not toadflax, poison-hemlock or wild carrot, for example. Aminopyralid can be used in the spring, summer or fall. It has a 35 day half-life in soil and is broken down by soil microbes. In water, the half-life is much shorter and it is broken down by UV light.

The Value of Statewide Invasive Plant Councils: The View From California and Beyond, *Doug Johnson, California Invasive Plant Council*

As I mentioned in the introduction to these notes, this conference had the optimistic message that communication and coordination really do help. The final speaker brought this home to us all and challenged us to consider forming an umbrella organization targeting invasive plants in our region. Invasive Plant Councils (IPC or also known as EPPC – Exotic Pest Plant Council) have been formed in many other states and regions to increase communication and coordination between non-profits (NGO's), agencies, researchers, and citizens working on managing invasive plants. Doug described several examples of IPC's from around the country and outlined the different levels of activities that they do. Following his presentation, Sarah Reichard led the group in a discussion about whether the Pacific Northwest could benefit from forming (or really re-forming) an IPC or EPPC. She gathered names of people interested in pursuing this idea and ideas for what this council would do. Stay tuned for more information on this exciting development.

If you have any questions about any of these talks or would like more information, please email me at sasha.shaw@metrokc.gov or call me at 206-263-6468 and I can pass along the contact information for the speakers. If anything seems confusing or inaccurate, my apologies to the speakers for my hasty note-taking, and please contact the source for clarification.